

## MEETING MINUTES (FINAL)

### CITY OF TUCSON HABITAT CONSERVATION PLAN

#### Technical Advisory Committee

Wednesday, November 7, 2007, 1:00 – 4:00 p.m.

U.S. Fish & Wildlife Service, Tucson Field Office

201 North Bonita Avenue, Suite 141

Tucson, AZ 85745

#### ATTENDEES

##### City of Tucson (COT) Habitat Conservation Plan (HCP) Technical Advisory Committee (TAC) members present:

Dennis Abbate (Arizona Game and Fish Department)

Marit Alanen (U.S. Fish & Wildlife Service)

Mima Falk (U.S. Fish & Wildlife Service)

Rich Glinski (Arizona Game and Fish Department – *retired*)

Trevor Hare (Sky Island Alliance / Coalition for Sonoran Desert Protection)

Ralph Marra (Tucson Water)

Guy McPherson (University of Arizona School of Natural Resources)

Linwood Smith (Environmental Planning Group, Inc.)

##### Other Attendees present:

Ann Audrey (City of Tucson – Office of Conservation and Sustainable Development)

Jamie Brown (City of Tucson – Office of Conservation and Sustainable Development)

Mike Cross (Westland Resources)

Michael Ingraldi (Arizona Game and Fish Department)

David Jacobs (Arizona Attorney General's Office / Arizona State Land Department)

Leslie Liberti (City of Tucson – Office of Conservation and Sustainable Development)

Shawn Lowery (Arizona Game and Fish Department)

Elissa Ostergaard (Arizona Game and Fish Department)

Phil Rosen (University of Arizona)

Geoff Soroka (SWCA)

#### 1. Minutes

The 7-18-07 and 10-3-07 Technical Advisory Committee (TAC) meeting minutes were approved with edits from Ralph, Dennis, and Trevor.

#### 2. Updates

##### Lesser Long-nosed Bat (LLNB)

Dennis said that lesser long-nosed bats (LLNB) were being monitored by Arizona Game and Fish Department (AGFD) staff and tracked to better understand their movement and foraging patterns in the greater Tucson region. He and the other researchers had expected to begin capturing LLNB in July. However, the first bats were captured August 21. Whether or not the

LLNB were in the area prior to then is unknown. Some individuals arrive in the Tucson area in late June and July. However, due to small numbers, these may not be noticed by feeder observers or the bats may not seek out feeders at this early arrival stage. The last LLNB was captured on October 29. Over the last few weeks, the bats significantly diminished in number and AGFD staff were getting no reports from residents monitoring hummingbird feeders. Between August 21 and October 29, AGFD staff members captured 20 different LLNB at nine different hummingbird feeder trap sites. Out of those 20, they were able to put radio transmitters on nine of them. Of those nine, there was one that lost its transmitter after one evening. Thus, AGFD staff tracked eight bats one-at-a-time throughout that time period.

Out of the 20 trapped bats, Dennis noted that 18 of them were males. Thus, all of the LLNB that were tracked were adult males, though he could not say what meaning or implications this may have. It is possible that the high number of male captures is an indication that females are foraging in different areas and/or are using different roosts. Out of the nine sites where AGFD staff trapped, there were only seven where they were successful in catching LLNB. At two of the sites, AGFD staff returned twice. Shawn said that no LLNB were captured south of Three Points, but added that the site south of Three Points had LLNB documented there in previous years both by the U.S. Fish and Wildlife Service and the Arizona Sonora Desert Museum. Dennis continued by saying that there were significantly fewer LLNB visiting feeders this year compared with previous years. At the times AGFD staff were trapping, they only noticed between one and six bats or so visiting feeders at any particular time.

Dennis said that they are summarizing the results of the study and developing a report, which will include a map of capture sites and travel paths to roost sites. He said that, in general, most of the LLNB seemed to stay north of River Road until they got to about Sabino Canyon Road as they flew from the northwest part of Tucson to the east side. This was the general area where they ended up roosting. Most of the LLNB went to the vicinity of Box Canyon, which is in Saguaro National Park East. Another LLNB went to the Agua Caliente Canyon / Redington Pass area. An individual thought to be going to Box Canyon ended up proceeding further south, going to the vicinity of Colossal Cave. Finally, another individual was going to the Box Canyon area but proceeded further south, crossed I-10, moved down Route 83 and along the Empire Mountains, then ended up near Sonoita. This individual moved a tremendous distance over a twenty-four hour period presumably to take advantage of the hummingbird feeders that it had visited previously. Shawn mentioned forage fidelity, saying that when AGFD staff members monitored LLNB movements on subsequent nights, they came back to the same areas, to the same feeders, and to the same night roosts, night after night.

Dennis said that they anticipate continuing the study next season and hope to get more information over the time between now and then to discuss changes to strategies or techniques. He requested any comments or suggestions from the attendees. Mike C. asked if LLNB were marked even if not tracking them as he thought it would be interesting over multiple years to see if the same cadre of bats are going to the same hummingbird feeders. Dennis said that they did not mark the bats this season and that there are ways of marking bats. Shawn added that there is controversy in the ethics of putting bands and biopsy punches through wings on bats. Thus they avoided the issue by marking only the individuals with transmitters. Mike I. added that they did not anticipate a long-term study when it was first designed. However, he said that there is a six-

year, long-term study of bats in Flagstaff involving banding which has yielded noteworthy results.

Trevor asked about the possibility of using flying transects to avoid running out of road on which to follow the LLNB. Dennis responded by saying that there are some complications with trying to fly at night, particularly in the metro area, with the presence of Davis-Monthan Air Force Base (DMAFB) and commercial flights. However, Dennis said that Trevor's point is valid and the idea is worth exploring.

#### *Davis Monthan Air Force Base Alternative Energy and HCP Species of Concern*

Leslie provided background information on the conversations taking place at Davis-Monthan Air Force Base (DMAFB) regarding energy sources. As a security measure, the U.S. Department of Homeland Security is pushing to have U.S. military bases become more energy independent. Therefore, they are looking at ways to generate more energy onsite, particularly renewable energy. DMAFB staff's original idea focused on waste energy. Subsequently, the City of Tucson (COT) formed the Davis-Monthan Alternative Energy Solutions Task Force to evaluate different options for the approximately eight megawatts of energy needed.

The list of options the Task Force examined included biogas, biomass thermal, solar thermal, landfill gas, hydroelectric, ocean, solar photovoltaic, solar wind, and three waste-to-energy options including plasma arc, waste incineration, and gassification. They have reduced the list to five, including the three waste-to-energy options, solar photovoltaic, and concentrated solar. The Task Force has gone through a long process to answer questions about what the technologies mean, how are they used in other countries, and issues or concerns associated with each. The Task Force is now at a point where members are ready to evaluate the remaining alternatives and, thus, they have been developing a set of criteria. The criteria categories include: 1) Economics for DMAFB; 2) economics for the community; 3) health, safety, and security, 4) land use; 5) regulatory issues; 6) natural and cultural resources; 7) quality of life; and 8) waste issues. They created a five-step rating scale ranging from -2 to +2, where +2 has positive benefits and -2 has negative benefits.

At the last Task Force meeting, someone mentioned that the COT is working on a Habitat Conservation Plan (HCP). So, the Task Force asked for feedback on potential natural resource issues. For the category of land use, one subcategory is open space (no open space loss, loss of open space, increase of open space). The second subcategory is wildlife/habitat (no wildlife habitat loss is neutral, loss of wildlife habitat is negative, and increase in wildlife habitat is positive) and the third subcategory is the Atterbury Wash and tributaries (no impact, negative impact, and positive impact). Office of Conservation and Sustainable Development (OCSD) staff talked about these internally, but felt that the Technical Advisory Committee's (TAC) input would be valuable because of the Task Force's concerns over impacts to species or habitat identified in the Southlands HCP. Leslie noted that the Task Force's study area is outside of the planning area for the HCP.

Leslie wanted to talk, from a natural resource perspective, about the types of criteria for these projects to ensure that they are properly evaluated. Leslie referred to a map generated by OCSD's Frank Sousa in which the area in yellow is COT land leased to DMAFB and includes

the aircraft “boneyard” area. The wash in the map is the Atterbury Wash, with State Trust lands located to the east. In terms of wildlife habitat impacts, OCSD staff members think there should be a greater refinement of those potential impacts such as noise, light, increased impervious surfaces, and vegetation loss.

The green line roughly delineates the sub-watershed of the Atterbury Wash. She said that this is significant for OCSD because the Tucson Audubon Society, working with OCSD and the Lincoln Groves Neighborhood Association, received a large grant to restore the Wash. This is an effort to which the COT is contributing \$300,000 (including cash and in-kind match). She continued by saying that this is one of the few intact, high quality watersheds remaining in the COT. She noted that the blue crosshatch on the map represents the 100-year floodplain.

Leslie said that the Task Force has not asked for input on either siting or recommendations on which alternative to choose. Instead, the Task Force wants to know, from a natural resources perspective, which categories to use and if they should be refined or adjusted. Mike I. said knowing whether or not the proposed activities would increase the road network or network of transmission lines (e.g. bird strikes) could be an important consideration given that they could have a negative impact on wildlife. Leslie responded by saying that under “Quality of life,” the Task Force has listed odor, noise, traffic, visibility, and aesthetics, but these are geared toward impacts to humans and not wildlife.

Ralph asked about the decibel levels given that the jets on DMAFB cause a lot of noise. Leslie indicated that the runway is in one area, while the area of interest is in another area. Dennis added that jet noises are intermittent but that noise from a power facility could be constant. Ralph asked if this held true for the photovoltaic options. Ann said that, if considering the waste-to-energy option and waste is imported, the noise impacts of trucks becomes a consideration.

Shawn and Mike I. said that, in terms of burrowing owl (BUOW) habitat, the ground is much harder near the “boneyard,” reducing the number of fossorial animals and, thus, burrows. However, BUOW are definitely there. Mike I. said that the burrowing owl area is in the northwest corner, but they did not do population surveys throughout as only the disturbed areas were surveyed. Mike I. also said that four nesting pair of Swainson’s hawks have been observed there and that it is an important wintering raptor area. He continued by saying that most of the Swainson’s hawks have been observed around the tarmac and just south off the DMAFB, nesting in the native trees. However, he said that AGFD staff did not specifically survey for Swainson’s hawks, but that they were observed while at DMAFB for other purposes. Mike C. said that the site would be outside the range of the Pima pineapple cactus (PPC).

Trevor asked about the density of the vegetative cover and whether or not it is scrubby like the Southlands. Leslie responded by saying that Frank Sousa indicated that vegetation is dense, with soapberry present, very large catclaw acacia, and 20-foot yuccas. She mentioned that Frank Sousa mapped an area containing dense stands of palo verde trees. Thus, the area has a high level of species and structural diversity in terms of vegetation. Trevor then asked when the site was fenced off from cattle. Leslie said that she thought it may have been in the 1960’s, but was unsure. She said that it is a 100-year lease.

Leslie said that she thinks the wildlife habitat category should be split since one does not get at direct mortality and issues of light and noise. Elissa said that Leslie may want to be more specific about what the proposed activity may do to the landscape in terms of habitat disturbance or fragmentation. That is, OCSD should recommend to the Task Force that disturbing and fragmenting as little open space as possible is preferable. Leslie said that maybe the open space category should become the habitat category and the wildlife habitat category should be limited to wildlife.

For the Atterbury Wash and tributaries, she said that the following is what OCSD staff were thinking of in terms of the scale. A -2 would be something inside the Atterbury watershed, while a -1 would be outside the Atterbury watershed, but impacting the 100-year flood plain. OCSD staff members are not sure what a neutral score would be. Ann said that she thought the rating system the Task Force is using is a little spurious because they are considering it neutral if something is not outright killed. Leslie said that not all of categories go the full scale (-2 to +2). Ann said that she would like to see “no impact” rated higher, so that if the project is kept out of the watershed, the project is scored with a +2. There was a suggestion to make the score for impact to already disturbed area a +2. Leslie said that some of the riparian habitat that Frank mapped is outside of the 100-year floodplain. In response, Trevor said that he thought a score of +2 would be given to projects where there would be no impacts to riparian habitat, whether or not it is mapped or unmapped.

For the wildlife category, Leslie said that she did not want the group to be too species specific because she wanted the Task Force to consider all species in case they move the study area and they decide to use the same criteria. For the wildlife subcategory, impacts from noise, light, traffic, nuisance attraction (e.g. exotic rats associated with garbage, cats, ravens), direct mortality (e.g. cars), and infrastructure (power lines, wind turbines). For the habitat category, the TAC mentioned invasive plants (e.g. from waste burning), fragmentation, habitat loss, and microclimate impacts (e.g. from heat).

Given the time, it was suggested that any remaining discussion on this topic be tabled for after the next agenda item, if time allowed.

### **3. Discussion: Expanded Southlands and wildlife corridors**

Leslie began by saying that the reason for the discussion was two-fold. The first reason was that the TAC has not really addressed road impacts in the Southlands beyond a general discussion in terms of wash crossings. It is important to also address the broader issue of how the road system fits within important corridors and habitat. The second reason was that because there is Regional Transportation Authority (RTA) funding for wildlife corridors (research, design, and other mitigation features), the issue is timely. Trevor inserted a comment that the research should be done prior to the building process. One reason is because the funding will be gone before that time. Leslie continued by saying that if the TAC has guidelines in place and has identified corridors that would be beneficial to the process. She distributed an 11” x 17” map of the Southlands which focuses on the Pima Association of Government’s (PAG) Southeast Area Arterial Plan (SEAAP).

Ralph asked that, given the time horizon for the HCP planning, if the proposed I-10 freeway bypass could have a bearing and how that might be considered in planning. Leslie responded by saying that she was under the impression that four alternatives are still under discussion, but didn't know if any of the options would impact the Southlands. She said that one of those bypass options would impact the Avra Valley planning area. Ralph added that it might be valuable to see if the proposed alignment data are available so that the TAC can keep this in consideration. *[Action Item: OCSD staff contact Cherie Campbell, transportation planning director of PAG, to ask about GIS files for the proposed I-10 bypass alignment through Avra Valley and the Southlands].*

Leslie continued by orienting the group to identified habitat in the Southlands. She referred to a previously created map saying that all that was identified as LLNB roosting habitat and most of the cactus ferruginous pygmy-owl (CFPO) habitat is south of Sahuarita Road, which is the southernmost road. She also said that the Sonoita Highway would become arterial and, therefore, signalized. Trevor said that the new Pantano Road alignment is not on the map and wondered what its impact would be on potential wildlife corridors. David said that the alignment is just outside of the Southlands HCP planning area.

For the sake of the guests, Leslie listed the HCP species of concern. She said that what the TAC did with pale Townsend's big-eared bat (PTBB) is look at the interface of upland and riparian habitat as being the important foraging area. The blue, crosshatched areas on the map indicate PTBB and LLNB roosting habitat. Shawn said that his concern was that there have been cases of bat habitat in erosion caves along washes and this may have been overlooked. Leslie said that in Cienega Creek and Pantano Wash there is desert tortoise habitat, but in the rest of the washes, the flow is much shallower with distributed floodplains.

Phil asked about the locations of desert tortoise along the Pantano Wash. Ann pointed to a 172-acre site on the map that had dots representing active or abandoned desert tortoise burrows. The site was surveyed, with 15 desert tortoises and 74 burrows (both active and abandoned) observed. She mentioned that the particular development required significant mitigation measures. Some were observed in the tributaries and some were observed on the ridges. Phil thought this sounded like a significant desert tortoise resource. Trevor said that Julia Fonseca, of Pima County, coordinating modeling for desert tortoise that included caliche caves. Phil said that there are probably no desert tortoise in Avra Valley to which Trevor responded that one was found in the lands part of the Central Avra Valley Storage and Recovery Project (CAVSARP).

Leslie asked the TAC and expert guests about corridors in the Southlands with the most wildlife movement, referring to Davidson Canyon and a crossing over I-10 as examples. Ann added that guidance from the TAC would be helpful on the question of the usefulness of mule deer movement patterns as an indicator for other species, referring to the study Mike I. is doing on the subject. Mike I. added that if mule deer use a corridor, many other species use it as well including mountain lions. He referred to a study in the White Tanks area in which mule deer movement patterns are used to tell AGFD where the major wildlife corridors are. Elissa added that mule deer require the largest underpasses, which also accommodate almost everything else. Elissa asked if we should protect a mule deer corridor between the Santa Ritas and the Rincon Mountains. Mike passed around a map and responded by saying that Professor Paul Beier at

Northern Arizona University did a least cost analysis of connecting the two ranges, suggesting a corridor east of the HCP planning area.

Trevor thought that it would be helpful to locate the constraints and be as broad as possible. As an example, he said that having an industrial area near I-10 would make a wildlife corridor less feasible and useful. Shawn noted that it is important to know land use designations in the planning area. Trevor added that private versus public land would be helpful to know so that the TAC would have a better idea of what could or could not be developed.

Phil asked if increasing the number of corridors under I-10 would be necessary because he noted that there are already several and they seemed to work well. Mike I. said that fencing would help funnel species appropriately. Phil asked if there is a high level of road mortality there to which Shawn and Mike I. said that that issue needs to be researched. Trevor said that tracking transects exist, which the Arizona Department of Transportation (ADOT) or Paul Beier may have. Trevor noted the need to be careful with fencing to not trap wildlife. Mike I. responded by saying that escape hatches are incorporated into the design for this purpose.

Leslie asked if all TAC members were comfortable using mule deer movements as a proxy for wildlife corridors in general. Trevor said that it is important to also consider microclimates for smaller species. Shawn said that the frequency of crossing structures should be determined by local habitat of species or the small home ranges of species specific to the area. Mike I. added that AGFD staff members have been working with Pima Department of Transportation (PDOT) staff on Houghton Road, Old Nogales Highway, and Sahuarita Road to find out where the best wildlife crossings would be, using roadkill as a surrogate for corridors. He said that PDOT needs the information for their 5-year planning process.

Discussion ensued about approaches to determining appropriate conservation measures for species with small home ranges. Phil said that minimizing snake mortality from vehicles would be a challenge because they cross almost everywhere. But, he said that if the TAC wants to protect blocks of habitat, then we could determine the road crossings and where roads are placed. Mike I. said that we should determine where the wildlife crossings are and then approach land use planners and recommend certain development. Phil said that he wants to know where development is planned.

David said that there is no Arizona State Land Department (ASLD) Conceptual Land Use Plan (CLUP) for the Southlands yet and that the estimated completion date has been pushed back until January 2008. Leslie said, based on what she has heard and read of ASLD's intentions, she estimates that buildout will not occur until 2025 or so. Mike I. said that road buildout could, however, occur in the next five years. Leslie said that the COT is trying to get ahead of the game and that not all of the protection will consist of setting up large preserves. Instead, she said that we should consider where we think development will occur, the CLUP, PAG's proposed Southeast Area Arterial Study, PAG's population projections, and where we know the species occur to determine protection at various levels (e.g. COT watercourse ordinances, NPPO, and preserves). She added that, at this point, the TAC's scale is really broad for the Southlands. So, while it is important to not just think about the large-scale corridors and species ranges when we consider conservation measures, it is also necessary to think about how to protect those species

with smaller ranges. Phil said that, in terms of small mammals, they need large, continuous blocks of habitat and that there are very few small mammals in the urban area of Tucson because of the paucity of these.

Rich asked how long it would take to gather mule deer movement data. Mike I. and Shawn said that another study near White Tanks in Maricopa County is expected to take nine months. Mike I. continued by saying that determining why mule deer attempt to cross roads in certain areas and not others (i.e. the “bottlenecks”) would be helpful. He said that they can plot these movements with satellite telemetry, getting a fix every hour. From this information, they can look at variables such as vegetation structure and see what may be important factors for the mule deer. To save money, the Regional Transportation Authority (RTA) wildlife linkages sub-committee is considering a two-phased study. The first priority would be the Tangerine Road area and the Tucson Mountains. The Southlands would be the secondary priority, using refurbished collars from the first study because of the long-term buildout for the area. The RTA has needed information on wildlife corridors in eastern Pima County and so we are working on a scope of work for this effort. Ann said that the current idea is to get experts into a room to draw corridors on maps, followed by modeling, and then ground-truthing. Ideally, she said that the process would take a year or two.

Trevor said that the one thing missing in this process of determining corridors is the fine scale, which Phil mentioned earlier. Phil responded by saying that he didn’t consider it as a corridor issue as much as a placement issue of roads and buildings. For example, he said that Mission Road, along the West Branch of the Santa Cruz, there is good habitat 100 meters away and yet there is very little, or no, road mortality. So, it is important to think about road alignments to bisect where, for example, amphibians are likely to move both in the short and long term.

Rich asked Mike I. if the situation in the Southlands with water is different than in the White Tanks area and what are the issues for mule deer movement are (e.g. competition, resource pressures, encroachment on habitat by development). Phil said that he thinks the resource issue is the most important as wildlife need to have access to water and forage. Trevor said that the TAC is working in uncertainty given climate change and so we need to be precautionary and conservative. Mike I. said that the mule deer study in the White Tanks area will be a four to five year study. He then said that he agreed with Phil on the need to plan road alignments to have less of an impact on natural resources used by wildlife, aligning the road with wildlife in mind and then also considering mitigation measures such as fencing. Elissa suggested that roads be made as permeable as possible in terms of wildlife crossing, targeted to a threshold of development density. She said that AGFD employees, anecdotally, have observed a diversity of snakes on five-acre lots with just one residence. Trevor mentioned that it was once thought that one house per 3.3 acres was sufficient to support cactus ferruginous pygmy-owls, but the data have not supported that claim.

Leslie said that she was not hearing anything emerging from the discussion for upland, micro-scale corridors. Mike I. said that every time a new road is built, a roadkill study should be done and appropriate mitigation measures should be created and enforced. He said that he agreed with Elissa that every road should be as permeable as possible. Also key are monitoring and adaptive management to see what works and what does not. Shawn said that we should use mule deer to



determine large corridors, then look at other species to define smaller corridors. Leslie asked what the target list of species is for the Southlands to determine these corridors and home ranges for smaller species. Phil said that he could determine important areas on a map right now, which will depend on which areas can remain habitat. He added that it is a distinctive landscape with floodplains and uplands. He said that it is good to put roads on the edges of floodplains, as opposed to crossing the floodplains. He said it is important to avoid putting a road between foraging and breeding habitat. Mike I. said that engineers determine the appropriate locations for roads and then ask them what kind of mitigation they can do in terms of crossing structures.

Phil mentioned the need to consider the trail network along the washes similar to what is along the Rillito River, which would be wildlife friendly. Trevor said that the TAC has discussed linear parks, incorporating large wash systems, where the uplands would be intended more for human use and the washes would support wildlife. The uplands in these linear parks would still be permeable for wildlife and would incorporate human restrictions on use hours and path lighting. Elissa suggested clustering the development near the roads. She added that having linear corridors behind residential backyards would be good as long as fences were erected to keep coyotes out.

Leslie said that what she was hearing is that the mule deer study can tell us where the large wildlife corridors are and where wildlife corridor bottlenecks might be. Trevor said that we may need to consider structures that force birds to fly above the freeway. Mike I. mentioned Russell Duncan's study from about 20 years ago in which he collected 3 years of telemetry data to understand how to get Mexican spotted owls above highways.

Leslie said that once large corridors have been identified, we can look at other species to determine smaller corridors. Phil concurred, saying that it would be an adaptive management framework suited to the development of the planning area. Marit said the TAC might need another indicator species for the micro-corridors. Mike I. said that with large species, the corridor is critical to their survival such that if they can't get to their wintering range, they often die. On the smaller scale species, Mike I. said that he thinks that one must look at every road to consider habitat areas for the micro-scale. Ann asked about picking mule deer to collar and if it is done in a stratified manner throughout the study area, to which Mike I. responded yes. She also asked about the number of deer necessary to collar to make the results statistically meaningful. Mike I. said that they recommended 16 deer given that feasibility and cost constraints were the biggest factors. Each collar costs \$4,500 since they are programmed to fall off to keep from choking the males.

Mike I. said that locations of mule deer fawning areas are important to determine to see if any occur in the HCP planning areas. These would be good areas to leave as undisturbed open space. Trevor asked what the characteristics of fawning areas are to which Cathy responded that these are areas with relatively more cover. Elissa said that, in terms of wildlife, it is always best to avoid putting in a road if that is an option. Trevor added that he thinks the proposed Southeast Area Arterial Study alignments form a relatively limited route system, which he is comfortable with, but is most concerned about what will go within it.

On a species-specific level, Mike I. said that AGFD staff are trying to develop road guidelines for engineers in terms of culvert sizes and fencing structures. He continued by saying that, this season, they will look at nine guilds to track their movements and test many different fencing structures in terms of maintenance, cost, and exclusion of as many guilds as possible. He said that the idea is to be able to bring that data and those guidelines to the managers and say that a certain design is, for example, X percent effective for species Y. Mike I. continued by saying that they are looking at many different culvert designs used throughout the Southwest. From these designs, they are investigating species preferences, roadway dimensions, and associated variables such as habitat type and number of lanes. Phil said that interval length is not known for snakes and said that in Organ Pipe National Monument, for example, culverts were placed at every wash and yet, many snakes are still killed on the road.

Elissa said that AGFD staff members are currently coordinating on two tracking studies. The first study is of urban coyotes outfitted with tracking collars, the report on which should be available in the next month or two. She said that the collared coyotes appeared to spend a lot of time in high-density residential areas but moved through very fast, often hunting housecats. She said that coyotes also spent a good deal of time in low and medium density development. They traveled a lot in washes, but most of the time they would not go under an overpass, preferring instead to cross over the road.

The other study Elissa mentioned focuses on mountain lion movement and is coordinated by a Ph.D. student. She said that the preliminary results suggest that they are spending most of their time in the mountains and ridges, yet crossing Oracle Road multiple times to get between the Tortolita and Santa Catalina Mountains. Mike C. asked if mountain lions forage on the edge of mountains near homes. Elissa responded that they tend to go where mule deer go. She said that they did monitor two mountain lions in the Santa Rita Mountains with tight home ranges high in the hills. They have noticed that males move around a lot and younger lions get kicked out into marginal habitat. Elissa said that the study has been going on for a year and may continue for another year to gather more data.

Phil said that if we end up preserving areas in the Southlands as open space and removing the cattle, future development could direct drainage water to these areas and improve deer habitat in the Southlands, which could attract mountain lions. Leslie said that this begs the question of what wildlife are appropriate for the urban environment. Trevor suggested that the TAC not consider this question because mountain lions come into urban areas even without corridors. Mike I. emphasized that the purpose of these studies is not about designing corridors for mountain lions. Elissa said that urban areas become oases for wildlife because of lush environments, food, and other reasons. Also, allowing wildlife to enter urban areas could make it possible for them to survive when they otherwise would not outside the City because of a lack of resources. She said that the main issue is that we need to increase the amount of education on living compatibly with wildlife in the urban areas. Trevor asked if covenants, codes, and restrictions imposed as a condition of development could help with issues at the human/wildlife interface such as restricting roaming animals (e.g. housecats). Leslie said that this underscores the importance of education as part of the HCP.

Leslie asked about species specific to the Southlands HCP and if the fencing and culvert study will adequately address the movement needs of desert tortoise. Mike I. responded by saying that AGFD staff members have another study near Wickenburg and Highway 93 specifically on desert tortoise. He continued by saying that it is generally known that roads negatively impact desert tortoise and that the zone of influence can be up to 4000 meters. For this reason, he said that we need more nuances in the approach to desert tortoise crossings. He continued by saying that they are hoping that the AGFD roadkill studies can determine where desert tortoises are crossing and how. He noted that a barrier does not have to be a fence. Instead, it could be a ditch with water or a width of large rocks.

Leslie wondered if there is a need to add desert tortoise movement patterns to the research list for this area. Phil responded by saying that we need to do a survey in the study area first to understand desert tortoise distribution and abundance. From the results, we then need to think about how they are using the habitat. Cathy mentioned that it could be a once in a ten-year movement that maintains the genetic diversity for desert tortoise, which makes it difficult to plan for their movements. Mike I. said that AGFD research staff are working on another study with human take of desert tortoise involving decoys and cameras. In the pilot study prior to the full study, they found that of 16 cars that passed the desert tortoise decoy, three cars stopped, picked up the desert tortoise, and took it with them. Mike I. said that there is also a robot desert tortoise being used to see how many are deliberately run over by riders on ATV's at different crossings. Preliminary results suggest the need for education in terms of signage.

Leslie asked if the group recommended any studies in addition to what Mike I. and other AGFD staff members are currently doing. Phil said that he thinks there needs to be an amphibian study to investigate how they might be living in proximity to a road and associated road mortality. Mike I. also suggested investigating road design for amphibians because of water pooling on roads from rumble strips, for example, which attracts amphibians. Leslie responded by saying said that it sounds like there also needs to be a proposal to investigate proper road design for amphibians. Trevor added that the Pima County road design is specific for cactus ferruginous pygmy-owls, but, as designed, it becomes a "death trap" for javelina because the design does not fence them out. So, he said, it is important to consider other species when designing road crossings.

Rich said that he is comfortable with what has been proposed in terms of studying mule deer to determine the locations of broad wildlife corridors. Trevor asked about railroads, dirt roads, and development and how those affect mule deer movement. Mike said that those questions are best answered after the study, which is what AGFD staff plan to do with the mule deer study in the White Tanks area, which could be applied to other areas of the state. *[Action Item: Marit asked if the TAC could also add road design for birds as a study topic, keeping it general to answer questions about how close vegetation should be from roadway edges.]*

Phil added that it is important to highlight the impact of roads on snakes. Mike I. said that AGFD is looking at proper fencing for snakes. Phil said that there is a study in San Diego investigating this and said that we need to look at how to not fragment landscapes to keep snakes in. Leslie said that the problem is that there is likely to be intense development in the northwest area of the Southlands and that the TAC prefers that. Phil said that we do not know how intense urban

development can be and yet still maintain viable populations of snakes. He said that he was not convinced that one could fence sufficiently when there is development in an area. Mike I. responded that road design is where his focus is because of the connection with the Regional Transportation Authority and the goal of reducing impacts of roads on wildlife.

Elissa said that Gila monsters had been mentioned earlier and that she heard that there has been a remarkable amount of Gila monster road mortalities on Old Spanish Trail road. Phil responded that it would be beneficial to investigate Gila monsters at the same time as investigating snakes and roads. Leslie asked Phil if he would look at Mike I.'s research proposals and have those be the first step since it is important that, in addition to considering the larger wildlife corridors, corridors for small wildlife also be considered.

Rich asked about whom would maintain these experimental wildlife corridors and fences. Trevor said that the Pima County Department of Transportation is monitoring roadway design. He continued by saying that, with an HCP, there needs to be assured funding for monitoring, with some funds allocated to monitoring of structures, such as roads. Rich said that if we are monitoring movements now where there is no development, as soon as development goes in, there will be pockets that really attract deer, javelina, cactus ferruginous pygmy-owl, and other species. So, fencing out urban attractants for wildlife is important. This is because the abundance and distribution of species in the Southlands planning area is completely different than what will be there after development occurs. Phil agreed and said that point speaks to the need to control that development for the sake of maintaining viable populations of wildlife.

Ann said that, from a planning perspective and working with developers, it is important to create guidelines of tradeoffs for developers. That is, for small developments, it would be helpful to identify the minor mitigation measures that could be recommended, such as reduced speed, in contrast to multi-million dollar wildlife crossings. Mike I. said that he and his staff are looking at two and four lane highways, which can be addressed with signage and appropriate speed limits. Ann requested that AGFD staff create a guidance document on appropriate wildlife crossing options for the neighborhood scale to be used by developers.

Leslie asked the TAC members what they recommended for the next meeting. Trevor said that the subject of Pima pineapple cactus (PPC) in the Southlands still needs discussion since there has not been agreement on appropriate conservation measures. He said that we need to follow-up on the subject of State Trust lands and mitigation banking. Leslie asked for any recommendations on experts to attend a meeting on PPC. Suggestions included Marc Baker, Chris McDonald, Mima Falk, Margaret MacIntosh, Steve Buckman, and Bob Schmalzel (recommended by a non-TAC member). Trevor said that the biggest question is where PPC are to be preserved *in situ*. Marit suggested that all TAC members read the USFWS five-year review of the PPC, which is on the USFWS-Arizona web site (<http://www.fws.gov/southwest/es/arizona/>).

#### **4. Call to the audience:**

Phil thanked the TAC for the invitation and for considering his recommendations.

#### **5. Adjourn**

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Summary of Action Items:

- OCSD staff contact Cherie Campbell, transportation planning director of PAG, to ask about GIS files for the proposed I-10 bypass alignment through Avra Valley and the Southlands.
- Marit asked if the TAC could also add road design for birds as a study topic, keeping it general to answer questions about how close vegetation should be from roadway edges.